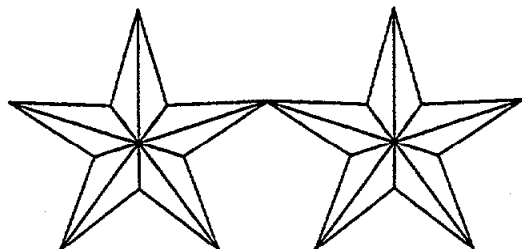

U. S. ARMY TECHNICAL CENTER FOR EXPLOSIVES SAFETY

EXPLOSIVES SAFETY

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**FROM THE COMMANDING GENERAL (CG)
OF U.S. ARMY ARMAMENT, MUNITIONS
AND CHEMICAL COMMAND
(AMCCOM)/U.S. ARMY DEPOT SYSTEM
COMMAND (DESCOM)**

The AMCCOM/DESCOM explosives/chemical safety programs are an essential element of my command to assure the protection and preservation of Army personnel and property against accidental loss.

There will always be a continuing need to remain vigilant with the explosives/chemical agent operations. The element of safety must be portrayed by our management as adding value to these operations. Realistically, safety is a cost-avoidance element of our overall mission. The costs of conducting our safety programs are recouped by avoiding the costs associated with loss of life, facilities, equipment, or mission.

As the CG of AMCCOM/DESCOM, I stress the need for conducting our missions with an extra awareness of safety. As we "right-size" our operations, it is vital we build in the essential safety program elements to carry this out safely. The missions accomplished by AMCCOM/DESCOM include risks which can be identified and controlled. It is my expectation that risk assessment and control will be practiced by each member of AMCCOM/DESCOM and those who support us.

The ammunition business is a customer and service-oriented industry. To assure that we support our customers, we need to share our expertise and advice on safety and respond to customer queries promptly. There are many ways this can be done; sharing lessons learned, reporting close calls, attending and contributing to safety meetings and training, and observing and reporting unsafe conditions. The ideas and resourcefulness of the service members and civilians within this command have assured success in a number of campaigns in the past. With open communications and responsiveness between all members of the industrial base, our service customers and commercial partners, we can build a good organization into a better one with safety as an integral and vital element.

I view the U.S. Army Technical Center for Explosives Safety (USATCES) Explosives Safety Bulletin as an excellent example of how we can share useful and valuable safety information. The objective is to communicate U.S. Army explosives/chemical agent safety information and policy to the field. The current distribution of the bulletin goes to over 5,500, including Department of Defense (DOD), other Federal agencies, industry, etc. In turn, the bulletin is shared by many disciplines at each address, thus expanding the audience.

I encourage the members of my Command, as well as the general readership of this bulletin, to participate and share their valuable expertise by contributing articles which can help improve the overall safety program for all. Everyone needs to be involved, so everyone benefits.

DENNIS L. BENCHOFF
Major General, USA
Commanding

DEVELOPMENT AND TESTING OF VAPOR CONTAINMENT STRUCTURE

The U.S. Army Corps of Engineers (USACE) is currently involved in the location and removal of buried unexploded munitions at formerly used defense sites (FUDS). In many cases these munitions will be liquid filled rounds containing hazardous chemical agents. A critical parameter for safety siting of the removal operation is the downwind hazard in the event of the accidental detonation of such a chemical munition. The use of a vapor containment structure (VCS) in combination with a high efficiency particulate air (HEPA) filter and activated charcoal filtration system over the munition removal site has the potential to substantially reduce the required downwind safety arc.

On 5 January 1993, a civilian contractor while digging a utility ditch for home construction in the Spring Valley community of Washington, DC uncovered a quantity of World War I munitions. This area was part of the former Camp American University where chemical weapons testing was conducted. An emergency response by the Army Explosive Ordnance Disposal (EOD) and the Army Technical Escort Unit (TEU) identified the items as possible chemical ordnance.

In accordance with Army Guidance for dealing with uncontrolled chemical agent releases, a service response force (SRF) commanded by Brigadier General George E. Friel was formed to stabilize the site. By the end of January 1993, the Army had completed site stabilization, recovering 137 munition items. All items were safely transported to holding areas at Pine Bluff Arsenal (PBA), AR; Edgewood Arsenal, MD; and Fort AP Hill, VA. This completed Operation Safe Removal and initiated operations managed by the USACE, Baltimore District with technical support from the USACE, Huntsville Division.

A geophysical survey was performed utilizing non-intrusive investigation techniques and mapping signatures of anomalies of the surveyed properties. Early in the survey, it was recognized that a process would be required to develop criteria for making evaluations whether anomalies were likely to be related to WWI activities. The process selected was the formation of an independent technical group known as the Anomaly Review Board (ARB). Over 60 anomalies were found by this process, with one having circumstances which required an innovative removal operation.

The anomaly at Wesley Seminary on the Former Camp American University area was determined by the ARB to be possible buried ordnance. The close proximity with Wesley Seminary and the American University posed numerous logistical and safety problems. The No Significant Effects (NOSE) distance for chemical agent exposure was calculated at 329 meters for an uncontained detonation. The requirements to evacuate to the NOSE distance upon discovery of chemical agent filled munition would have impacted the American University in addition to the Wesley Seminary and many private residences. This was determined to be an ideal site for implementation of a VCS. A reduction in the NOSE by using a VCS would enhance safety and provide significant savings.

In January 1994, a test program was initiated by USACE, Huntsville Division to determine the containment capabilities of the VCS. The VCS structure selected was a transportable 14 gauge steel-arch structure with an I-beam base. The prototype VCS was tested for the possible chemical agent filled munitions which could be buried at the Wesley Seminary location. The munitions evaluated were the Livens projector and the 4.7 inch artillery, both used exclusively in World War I. Prototype testing was performed by Southwest Research Institute (SwRI) in San Antonio, TX.

In May 1994, the prototype structure testing was completed. The structure contained 99.777% of the simulant agent resulting from a detonation of 4.7 inch artillery. The contained simulant

agent was then extracted from the structure by the air handling system. This resulted in a reduction in the NOSE from 329 meters to 50 meters for the Livens and under 20 meters for the 4.7 inch.

The results were outstanding considering that the prototype was tested in worst case conditions with extremely conservative fragmentation and overpressures exposures. There was no structural damage to the prototype structure and the explosive blast pressures were contained within the structure. Fragmentation which would perforate the structure will be significantly reduced in velocity and will fall well within the exclusion zone radius of 75 feet. The actual conditions after a detonation in the field would be much less severe.

The VCS will be a great benefit to the buried ordnance removal at the Wesley Seminary site at Former Camp American University. The VCS provides greatly increased safety to the public and provides great cost savings for the Government. The VCS will be used extensively in situations requiring reduced evacuation distances and for bulk storage in the field. Use of VCS is recommended for other sites providing the sites fall within the parameters of the prototype VCS testing. The prototype VCS will remain in place at SwRI for the next year if testing for other conditions is required.

by: Mr. Jim Manthey
Structural Engineer
DSN 645-3232.

STORAGE OF MATERIALS HANDLING EQUIPMENT (MHE) IN AMMUNITION AREAS

There's been a significant change to Department of Army (DA) guidance on the storage of MHE in ammunition areas. TM 9-1300-206, August 1973, Ammunition and Explosives Standards, states that, when necessary for efficient operation, battery-powered MHE permitted for use in the ammunition area may, under specific conditions, be temporarily stored in magazines containing packaged ammunition and explosives.

When draft DAP 385-64, Ammunition and Explosives Standards, was distributed for implementation among the Army ammunition communities in 1993, it contained the new requirement that battery, gasoline, or diesel-powered equipment may be stored in locations that contain only inert materials. No easements for "efficient operations" were included in the DAP.

Based on a recommended change from the Safety Office, HQ, U.S. Army Materiel Command (AMC), MHE storage guidance identical to that found in TM 9-1300-206 has now been included in the latest revision of draft DAP. A review of an explosives accidents data base being developed at the U.S. Army Technical Center for Explosives Safety (USATCES) indicated no history of problems with the temporary storage of battery-powered MHE in magazines containing packaged ammunition and explosives. Provisions of this pamphlet apply to all DA installations and activities, the Army National Guard (ARNG), and the U.S. Army Reserve (USAR).

Although the regulations concerning storage of MHE in ammunition areas now agree, it's important to remember that if there is a conflict between the guidance furnished by TM 9-1300-206 and the guidance contained in draft DAP 385-64, the provisions of the DA Pamphlet apply.

by: Mr. James B. Farley
QASAS
DSN 585-8787.

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM (DERP) FOR FORMERLY USED DEFENSE SITES (FUDS) - FY 95

The U.S. Army Technical Center for Explosives Safety (USATCES), in partnership with the U.S. Army Corps of Engineers (USACE), Rock Island District, continues support of the U.S. Army Engineer Division, Huntsville (USAEDH) with that part of the program which addresses the assessment and cleanup activities of ordnance and explosives waste (OEW) at FUDS.

Former installations and locations to be inspected during the first and second quarters of FY 95 are:

Fort McKinley	Great Diamond Island, ME
Goshen Point AMTB Battery 914	Waterford, CT
Hingham Naval Ordnance Depot	Hingham, MA
Hingham Naval Ordnance Depot (Annex)	Hingham, MA
Camp McCain	Grenada, MS
Meehan Range	Meridian, MS
Lake Murray Bomb Range	Lexington, SC
Charleston SMARA	Charleston, SC
Camp Claybanks	New Era, MI
Tri-City Army Airfield	Saginaw, MI
Camp Mackall	Hoffman, NC
Charlotte Naval Ordnance Depot	Charlotte, NC
Camp McCain Maneuver Area	Oxford, MS
Grenada AAF Rifle Range	Grenada, MS
Sabana Seca Ammo Storage Area	Toa Baja, PR
Ramey Air Force Base	Aguadilla, PR
Black Creek Bomb Target	Middleburg, FL
Palm Beach Air Force Base	West Palm Beach, FL
USAR Naval Range Clearance Project	Vero Beach, FL
Carlstrom Field	Arcadia, FL
Fort Taylor	Key West, FL
Foster Air Force Base	Victoria, TX
Manhattan Beach Railway	Manhattan Beach, CA
San Bernardino Engineer Depot	San Bernardino, CA

Anyone having information on these installations is requested to forward materials or suggestions to: Director, U.S. Army Technical Center for Explosives Safety, ATTN: SMCAC-ESL, Savanna, IL 61074-9639.

by: Mr. Thomas Reinhardt
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DSN 585-8789

EXPLOSIVES SAFETY TRAINING

Explosives safety training has been alive and well at the U.S. Army Defense Ammunition and School (USADACS) since the inception of the Ammunition Inspection School (AIS) in November 1950. Explosives safety has always been a primary aspect of the training curriculum for ammunition inspectors and the present day Quality Assurance Specialist (Ammunition Surveillance) (QASAS).

The Ammunition School at USADACS, along with its predecessor, AIS, historically trained many individuals other than ammunition inspectors and QASAS. The mid-1970s brought about the recognition that specific training courses were needed for the ammunition mission personnel within the U.S. Army Materiel Command (AMC) and its predecessor, U.S. Army Materiel Development and Readiness Command (DARCOM). At this time, the Technical Ammunition Course was established to provide neces-

sary training to ammunition personnel (principally wage-grade leaders and supervisors) in the safe conduct of explosives operations. This course, as well as additional courses developed for ammunition maintenance, ammunition demilitarization, toxic chemicals, and guided missiles, gives primary attention to explosives safety issues. With the advent of the Ammunition Management (AM) intern program in 1984, a new set of ammunition personnel received explosives safety instructions as an integrated part of their master Intern Training Plan (ITP).

The Explosives Safety Management Program (ESMP) was established in 1988. The ESMP assigned responsibility to USADACS to provide explosives safety training to support Army career program (CP) requirements. This led to the development of the U.S. Army Explosives Safety Course, which is presented to all Army safety interns and safety specialists.

Additional changes occurred in explosives safety training at USADACS in 1988. The Naval Sea Systems Command (NAVSEASYS COM) and the U.S. Army Armament, Munitions and Chemical Command (AMCCOM) signed a Memorandum of Agreement (MOA) assigning responsibility to USADACS for the conduct of explosives safety training for NAVSEASYS COM. This initial tasking included two courses which had been presented at the NAVSEASYS COM explosives safety school in Bloomington, IN. Since 1988, four additional explosives safety courses have been developed by USADACS for NAVSEASYS COM.

The 1990s have led to additional explosives safety course development at USADACS. Based on a request from the 25th Infantry Division (Light), the "Explosives Safety in Support of Firing Ranges" course was developed to support specific explosives safety requirements of the using units. The "Hazard Analysis for Ammunition Operations" course was recently developed to support the planning and execution of explosives operations within AMC. The "Explosives Safety for Defense Contractors" course was developed to meet the needs of the Defense Logistics Agency (DLA), Defense Contract Management Command, and defense contractors dealing with explosives and ammunition.

The Ammunition School Course Catalog, containing a complete listing and description of all courses presented at USADACS, as well as the FY 95 schedule, is available from the School's Academic Services Department. For more information call Ms. Cheryl A. Guenzler, commercial (815) 273-8934 or DSN 585-8934, or write to Director, U.S. Army Defense Ammunition Center and School, ATTN: SMCAC-ASA, Savanna, IL 61074-9639.

Current USADACS explosives safety courses include:

NUMBER	COURSE TITLE
AMMO-C-15	Explosives Safety for Naval Facility Planning
AMMO-C-21	Basics of Naval Explosives Hazard Control
AMMO-C-22	U.S. Army Explosives Safety Course
AMMO-C-25	Naval Explosives Safety Managers/Supervisors Orientation Course
AMMO-C-27	Electrical Explosives Safety for Naval Facilities
AMMO-C-33	Electrical Explosives Safety for Army Facilities
AMMO-C-35	Hazard Analysis for Ammunition Operations
AMMO-C-38	Explosives Safety for Defense Contractors
AMMO-C-40	Explosives Safety in Support of Firing Ranges

by: Mr. John Gray
QASAS
DSN 585-8255

The EXPLOSIVES SAFETY BULLETIN targets the ammunition/explosives community. It is printed in Savanna, Illinois. If you wish to submit an article that is of interest to the ammunition/explosives community, or if you have a request for more copies of the bulletin, please forward it to: Director, U.S. Army Technical Center for Explosives Safety, ATTN: SMCAC-ESM, Savanna, IL 61074-9639 or call us at DSN 585-8745/COMMERCIAL (815) 273-8745.

SIMPLIFYING QUANTITY DISTANCE (QD)

To calculate QD, you must first determine which of the three types of storage you have. The first type is underground storage. This is storage in caves or man-made caverns and typically has large quantities of earth cover over the actual storage chambers.

The second type is earth covered magazines (ECMs). These are commonly referred to as igloos and will normally have about two feet of earth cover over the magazine itself. These can be standard (constructed according to the drawings listed in appendix G, DAP 385-64) or nonstandard.

The third type is aboveground magazines. This includes anything that doesn't fall into the other two categories, such as field storage units, truck holding areas, loading platforms, and just about anything else that contains explosives or ammunition.

Next, determine what you want to protect. To protect people and/or nonammunition related buildings, use "inhabited building distances (IBD)." To protect traffic or remote operations, use "public traffic route (PTR) distances." To protect an operation, other than a remote operation, use "intraline (IL) distances." To protect a magazine, use "magazine distances."

Finally, check the special cases and exceptions listed in chapter 5 of DAP 385-64. These tend to fit special situations or equipment and are not difficult to understand.

While this is very quick and short, hopefully it will make your next encounter with QD much simpler. If you have any questions, call me or anyone at USATCES.

by: Mr. Greg Magerl
Logistics Management Specialist
DSN 585-8743

EXPLOSIVES LICENSING

Draft DAP 385-64, 13 August 1993, Ammunition and Explosives Standards, requires that an explosives license, together with maps of the explosives location and surrounding area, be available at the servicing safety office. The license, a permanent document, will be certified, dated, and reviewed annually by the local safety manager/director and contain information on:

- Ammunition or explosives area location.
- Ammunition or explosives facility location.
- Type of facility.
- The Hazard Division (HD) authorized.
- Allowable limits of each HD {expressed in pounds (NEW) or kilograms (NEQ)}.
- Determining factor or object which limits the amount of ammunition or explosives in each HD.
- Actual separation distance between the ammunition or explosives facility location, and the determining factor.

The local explosives license should agree with all of the Department of Defense Explosives Safety Board (DDESB) site plan approval(s) for the installation.

by: Mr. James B. Farley
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